

**A STUDY TO DETERMINE THE EFFECT OF BACK STRENGTHENING
EXERCISES IN REDUCING LOW BACK PAIN AMONG
PATIENTS ATTENDING SREE MOOKAMBIKA
MEDICAL COLLEGE HOSPITAL AT
KANYAKUMARI DISTRICT**



**A DISSERTATION SUBMITTED TO THE TAMILNADU
DR. M.G.R MEDICAL UNIVERSITY, CHENNAI IN
PARTIAL FULFILLMENT FOR THE DEGREE
OF MASTER OF SCIENCE IN NURSING**

APRIL- 2012

ACKNOWLEDGEMENT

I, the investigator of this study owe a deep sense of gratitude to all those who contributed to the successful completion of this endeavor.

First of all, I praise the God Almighty for giving me strength and courage to overcome the difficulties and complete the dissertation successful.

I extend my sincere thanks and gratitude to the **Chairman Dr.Velayudhan Nair M.S.**, and **Director, Dr.Rema.V.Nair M.D.,D.G.O.**, **Sree Mookambika College of Nursing**, Kulasekharam, for providing necessary facilities for the successful completion of the study and for their valuable guidance.

I wish to place my sincere thanks to **Prof. Santhi Letha, M.Sc(N).**, **Principal**, Sree Mookambika college of Nursing, Kulasekharam, for her excellent guidance, encouragement, Valuable expert advice and Constructive criticism from the initial to final level enabled me to develop an understanding of the subject, as well as to carry out the study on time.

I acknowledge my sincere gratitude to **Mrs. Ajitha Rethnam, M.Sc(N).**, **HOD.**, Department of medical surgical nursing, Sree Mookambika College of Nursing, Kulasekharam, for all the support, direction and guidance for the successful completion of the study. Without doubt I will look back with fond memories and nostalgia on my time under your supervision, characterized always by latitude, trust, stimulation, enthusiasm and continual support.

I am grateful to **Prof. Arumugam, B.Sc., M.A., M.P.S., PGDCA**, Professor of Biostatistics, for his valuable statistical suggestions and guidance for this study.

I owe my deepest sense of gratitude to **Dr.J. Kaniraj Peter M.D,Professor General Medicine**, Sree Mookambika Medical College Hospital, Kulasekharam for consistent help, academic support, direction and guidance to complete this study.

I acknowledge my sincere thanks to. **Mrs. Adlin Sujitha, M.Sc(N) and Mrs. Adlin Shinija, M.Sc(N)**, Department of medical surgical nursing, Sree Mookambika College of Nursing, Kulasekharam, for all the suggestions and guidance rendered by them for the perfection of the study.

My heartfelt thanks to all the **faculty of nursing**, Sree Mookambika College of Nursing, Kulasekharam, for their support and guidance during my study.

My heartfelt thanks to all the **staff nurses in the out patient department and physiotherapy unit** of Sree Mookambika Medical College Hospital who whole heartedly co-operated with me for conducting the study.

I extend my gratitude to all the **staff of the library**, Sree Mookambika College of Nursing, Kulasekharam, for all the help provided in reference work for the study.

I shall be failing in my duty if I don't thank my beloved **family members and friends** for their invaluable sacrifice and constant encouragement throughout the course of the study.

I am very thankful to **staff of Good Morning Xerox, Kulasekharam** who helped me in bringing this study in a printed form.

Last but not the least, my sincere gratitude goes to all the **participants of the study** for spending their valuable time and their sincere co-operation.

Finally the investigator thank all those who inspired her to undertake the topic confidently and complete this dissertation on time.

Investigator

**A STUDY TO DETERMINE THE EFFECT OF BACK STRENGTHENING
EXERCISES IN REDUCING LOW BACK PAIN AMONG
PATIENTS ATTENDING SREE MOOKAMBIKA
MEDICAL COLLEGE HOSPITAL AT
KANYAKUMARI DISTRICT**

INTERNAL EXAMINER

EXTERNAL EXAMINER

**A STUDY TO DETERMINE THE EFFECT OF BACK STRENGTHENING
EXERCISES IN REDUCING LOW BACK PAIN AMONG
PATIENTS ATTENDING SREE MOOKAMBIKA
MEDICAL COLLEGE HOSPITAL AT
KANYAKUMARI DISTRICT**

Approved by the dissertation committee on :

RESEARCH GUIDE

Prof. Santhi Letha M.sc (N).,

Principal, Sree Mookambika College of Nursing,

Kulasekharam, Kanyakumari District :

SUBJECT GUIDE

Mrs. Ajitha Rethnam, M.sc (N).,

Head of the department, Medical surgical nursing,

Sree Mookambika College of Nursing,

Kulasekharam, Kanyakumari District :

MEDICAL GUIDE

Dr. J. Kaniraj Peter M.D.,

Professor, General Medicine,

Sree Mookambika Medical College,

Kulasekharam, Kanyakumari District :

**A DISSERTATION SUBMITTED TO THE TAMILNADU
DR. M.G.R MEDICAL UNIVERSITY, CHENNAI IN
PARTIAL FULFILLMENT FOR THE DEGREE
OF MASTER OF SCIENCE IN NURSING
APRIL- 2012**

CERTIFICATE

This is to certify that this is a bonafide work of _____
II year M.sc Nursing, Sree Mookambika College of Nursing, Kulasekharam in
partial fulfillment of the requirement for the degree of Master of Science in
nursing.

Place: Kulasekharam

Signature

Date :

Principal

Sree Mookambika College of Nursing

ABSTRACT

Introduction

The study was undertaken to determine the effect of back strengthening exercises in reducing low back pain among patients attending Sree Mookambika Medical College Hospital at Kulasekharam in Kanyakumari district.

Study Objectives

1. To determine the effect of back strengthening exercises in reducing low back pain among patients in experimental and control group.
2. To find out the association between the level of pain with selected demographic variables such as age, gender, education, occupation and body built.

Hypotheses

H₁ – There is a significant reduction in the mean pain score of patients in experimental group than in control group.

H₂ – There is a significant association between the level of pain and selected demographic variables.

Research methodology

The researcher adopted a quantitative approach with two group pretest post test design. Patients attending Sree Mookambika Medical College who were diagnosed as low back pain were selected. Pre test

assessment was done with Aberdeen low back pain scale and 60 patients with mild to moderate level of pain were selected and 30 samples were allotted in experimental group and 30 in control group. Back strengthening exercises was given to the experimental group. Post test was conducted to the experimental and control group on the 15th day. The collected data were analyzed based on the above mentioned objectives using the descriptive and inferential statistics.

Study findings

The pretest of experimental and control group revealed that there was no significant difference. Both experimental and control group were similar in respect of demographic variables and thus it was observed that they were identical.

The study identified that the level of low back pain was reduced in experimental group. It was found that there was a significant reduction in the level of back pain of experimental group after back strengthening exercises than in the control group. The 't' value of difference of mean reduction of low back pain tabulated was found to be $t = 6.11^*$, $df = 58$, $P < 0.05$

In the study it was found that there was no association between the level of low back pain of experimental and control group with their selected demographic variables such as age, sex, education, occupation and body built.

Conclusion

Low back pain is seen as an issue for all ages, and all sectors of society. One common component of pain treatment programs is a focus on increased physical activities and exercise reconditioning. Exercises would increase strength and concomitantly decrease pain as a long term effect. The investigator found that back strengthening exercises was very much effective and beneficial in reducing the level of back pain among patients with low back pain.

CHAPTER-1

INTRODUCTION

“If you don’t keep moving, it’s easy to get locked into a downward spiral.”

(Olaya - Contreras from Daily Express)

The lower back is a complex of bones, ligaments, muscles, tendons and nerves that together are amazingly adaptable to a wide range of movement and function. It forms the infrastructure of a biological machine that anchors the kinetic chain and transfers biomechanical forces into coordinated functional activities. The spine acts as a conduit for precious neural structures and possess the physiological capacity to act as a crane for lifting and a crankshaft for walking. But the complexity of this region is also why it is quite vulnerable to injury, considered by scientists an example of incomplete evolution of the species. Modern civilization has done us few favours in how we sit at desks and in car seats for extended periods of time, which tends to tighten the muscles and other softer tissues (tendons) into one position.

(Back Pain Myths, 2010)

Low back pain refers to pain associated with some type of activity that causes undue stress on the tissues of the lower back. Low back pain is at epidemic levels in India and it is one of most common afflictions in our society. It is the leading reason for physician office visits, hospitalizations and surgery, and work disability.

(S.Sridevy. Nightingale Nursing Times, 2008)

World Health Organisation estimates that around 52% of population suffer from low back ache according to (2003) statistics. According to National Health survey (2001) 6 million around country suffer from back pain. The life time prevalence of an episode of significant low back pain is 60% to 90%.

The life time prevalence of low back pain is reported as over 70% in industrialised countries (one year prevalence 15% to 45%, adult incidence 5% per year). The prevalence rate during school age approaches that seen in adults, increasing from childhood to adolescence, and peaking between ages 35 and 55. Around two-thirds of people are likely to experience relapses of pain over 12 months, and around a third are likely to have relapses of work absence.

(European Guidelines For Prevention In Low Back Pain, 2004)

World institute of pain reveals that in 2004, the incidence of low back pain was 51.4% in patients aged 18 or older. The incidence was slightly high in women than men ie, 53 vs. 49.9%.

Low back pain can arise from many causes. It can range from a dull annoying ache to absolute agony. Most women suffer from non-specific low back pain than men. Increasing age, heavy physical work, heavy lifting, twisting, psycho factors, depression, obesity are the common predisposing factors. Mechanical lumbar syndromes are typically aggravated by static loading of the spine (eg, prolonged sitting or standing), by long lever activities (eg, vacuuming or working with the arms elevated and away from the body), or by levered postures (eg, bending forward).

(Health Grade Medical Statistics Centre, Mumbai)

According to the Bureau of Labour and Statistics, metal workers generate 76% of all claims of back strain and/or sprains. Jobs that require heavy manual labour and material-handling activities account for more than half of all back pain reports. Injuries to the back are highest among truck drivers, operators of heavy equipment, and construction workers.

(Anthony. H. Wheeler, 2011)

Conventional medical management includes rest, aspirin, physical therapy and education. Gastrointestinal, renal, and potential cardiac toxicities must be considered with long-term NSAID use. Surgical treatment for lumbar syndromes is most common in the United States, where the estimated rate is at least 40% higher than that in other countries and more than 5 times higher than rates in Scotland and England. Apart from these surgeries can produce injuries to the posterior spinal muscles and their nerve supply, which may be a source for continued loss of function and pain. Studies recently reported in The New England Journal Of Medicine, shows non-surgical therapies including stretching and exercise can have almost great effect as surgery in relieving back pain.

(Care Clinic Health Watch Series-3)

Movement helps exchange nutrients and fluid within the disks to keep healthy. And by stretching the piriformis muscle, where the sciatic nerves found can ease the pain. A tear in the outer structure of disc can make the soft gel protrude out. By exercises the outer covering annulus can be strengthened and there by decreases the pain.

(Ron.S. Miller.PT, 2000)

Back strengthening exercises are to strengthen and to stretch the muscles that support the spine. Conditioning through flexibility and strengthening back exercises not only helps the back avoid injury, or minimize the severity of injury if spine is traumatized, it also can help relieve the pain of many back conditions. It strengthens the spinal column and the supporting muscles, ligaments and tendons. Most of the back exercises focus not only on the back, but also the abdominal muscles and gluteus and hip muscles. These strong core muscles can provide back pain relief because they provide strong support for the spine, keeping it in alignment and facilitating movements that extend or twist the spine. It is very necessary to provide exercise as one of the nursing interventions to reduce low back pain.

(Peter.F. Ullrich, 2009)

Significance of and need for the study

Low back pain is at epidemic levels in India and even rural has not been left untouched. In India, occurrence of low back pain is alarming; nearly 60 percent of the people in India have had significant back pain at some time or the other in their lives.

(India Latest News Headline Today,2010)

Back pain is the most common reason for filling workers' compensation claims and often causes lost work days. Data from 1998 National Health Interview Survey claimed that the prevalence of lost –work days due to back pain was 4.6% and individuals with work related cases lost 101.8 million work days owing to back pain on American industries.

(H.R. Guo, 2011)

According to CDC (Centre for Disease Control), back pain is the leading cause of disability in the U.S. and results in \$50 billion annually in health care and workers' compensation costs. Low back pain ranks fifth among the most frequent reasons for hospitalization and third as a reason for surgical procedures. Patients who cannot work because of their spinal pathology and remain symptomatic beyond 1 year have less than a 25% chance of returning to their jobs.

(David M.Carpenter,1999)

In Canada, Finland and the U.S. more people are disabled from working as a result of musculoskeletal disorders especially back pain. The National Arthritis data Workgroup reviewed that each year 15% adults report frequent back pain or pain lasting for more than 2 weeks.

(Lawrence etal,1998)

Department of Orthopaedics, Paraplegia and Rehabilitation, Post graduate Institute of Medical Sciences tried to find the psychosocial and demographic factors contributing to the high incidence of low back pain. The study concluded that people in jobs involving heavy manual work were most affected by low back pain and it also pointed out that low back pain has a lot to do with ones' profession. Low back pain was identified by the Pan American Health organization as one of the top 3 occupational health problems by surveillance within the W.H.O. regions of America.

(Choi etal, 2011)

Dongre.Alpana, Sharma.Sanjeev (2008) conducted a study to identify the prevalence of thoraco-lumbar dysfunction and analyse the role of latissimus dorsi muscle. The study revealed that concentric strengthening of latissimus dorsi and core stabilization exercises together are very effective in relief of thoraco-lumbar related back pain.

A study conducted by Cox JM, et al.(1987) on lack of exercise as a cause of back pain and it revealed that 47% suffered back pain who had exercised regularly and 86% suffered back pain who had not exercised regularly.

Eric. L. Hurwitz (2000) conducted a study on effects of back exercises on low back pain and psychological distress pointed out that as the participation in physical activity and exercises increased, the odds of experiencing clinically meaningful low back pain and disability reduced to 30% at subsequent assessments.

A study was conducted to demonstrate the effect of a once a week exercise program focused specially at lumbar extensor strengthening revealed that the significant increase in strength associated with the exercise program correlated with the greatly reduced incidence of back claims.

As the effective pain management presents a significant challenge for physicians and other health care professionals the researcher wants to conduct a study regarding the effect of back strengthening exercises in reduction of low back pain.

Statement of the Problem

A study to determine the effect of back strengthening exercises in reducing low back pain among patients attending Sree Mookambika Medical College Hospital, Kulasekharam at Kanyakumari district.

Objectives of the study

1. To determine the effect of back strengthening exercises in reducing low back pain among patients in experimental and control group.
2. To find out the association between the level of pain with selected demographic variables such as age, gender, education, occupation and body built.

Hypotheses

H_1 – There is a significant reduction in the mean pain score of patients in experimental group than in control group.

H_2 – There is a significant association between the level of pain and selected demographic variables.

Operational Definitions**Effect**

Refers to the positive outcome expected by the investigator after the performance of back strengthening exercises in reducing low back pain among patients in experimental group as measured by Aberdeen Low Back Pain Scale.

Back Strengthening Exercises

In this study back strengthening exercises refers to the exercises which the investigator teaches/demonstrates for patients in experimental group and makes them practise the same for a duration of one week approximately for 30 minutes per each sessions.

Exercise session includes:-

- **Knee to chest exercises** :- In this session patient is advised to lie on his back on a firm surface. Clasp his hands behind the thigh and pull it towards his chest. The patient is instructed to keep the opposite leg flat on the surface of the floor. Maintain the position for 3 seconds. Switch legs and repeat 5 times.
- **Lower abdominal exercises** :- Patient is advised to lie on his back with his knees bent and feet flat on his bed. Raise his both knees towards chest. Place both hands under his knees as close to his chest as possible. The patient is advised not to raise head and repeat for 5 times.
- **Knees to chest exercises** :- Patient is advised to keep his knees bent and lie flat on the floor. Flatten his back to the floor by pulling his abdominal muscles up and in. Raise his legs keeping knees straight. Hold for 3 seconds. Slowly lower the leg to the floor. Maintain pelvic tilt and keep resting leg relaxed at all times. Do not hold breath.
- **Pelvic tilt** :- In this session patient is advised to push the small of his back into the floor by pulling the lower abdominal muscles up and in.

Hold his back flat while breathing easily in and out. Hold for 3 seconds.
Do not hold breath.

- **Leg raises** :- Patient is advised to lie on his stomach. Tighten the muscles in one leg and raise it from the floor. The patient is instructed to hold his leg up for a count of 5 and return it to the floor and do the same with other leg.
- **Hip extension** :- In this session patient is advised to bend his knees to a 90 degree angle so the sole of his foot faces the ceiling. Lift one thigh off the floor approximately 6 inches by raising his foot towards the ceiling. Slowly lower his thigh back to the starting position. Repeat 5 times.

Low Back Pain

It refers to the pain on the lumbar side from L2 to L5 as measured by Aberdeen Low Back Pain scale.

Assumptions

- Majority of the persons may have low back ache.

(Dongre Alpana,2008)

- Most women may have low back pain than men.

(Indian Medical Journal)

- Heavy workers may have higher incidence of low back injuries.

(Badlley etal, 1994)

- Back strengthening exercises may have influence in reducing the low back pain.

(Peter F. Ullrich, 2009)

Delimitations of the study

Study is delimited to:-

- Sixty samples only.
- Period of study was one month.
- Samples were from one hospital.
- Subjects who are willing to participate.

Ethical Considerations

The proposed study was conducted after the approval of ethical committee of Sree Mookambika College of Nursing and from the hospital authorities. Oral consent was also obtained from each participant before conducting the study. Subjects were assured that the privacy and confidentiality would be maintained.

Conceptual Framework

The conceptual framework adopted for the present study is based on Lydia.E.Hall's Core, Care and Cure model (1994). She considered a basic philosophy of nursing upon which the nurse may base patient care. As a nurse theorist, Lydia. E. Hall is unique in that her beliefs in nursing were demonstrated in practice. Hall presented her theory of nursing visually by drawing three interlocking circles ie, core, care and cure. The three aspects are interrelated and influenced by each other. Nursing has major role in these three aspects.

Core circle of patient care is based on the concept that patient looks at and explore feeling regarding his or her current health status and potential changes ie, core circle deals with patients' problems. In the present study core part deals with low back pain experienced by age group of 20 to 60 years.

Care circle presents the nurturing component ie, the concept of mothering (care and comfort of patients) and provide for teaching learning activities. In this study care circle includes the demonstration of back strengthening exercises and post test assessment level of pain.

Cure circle of patient care is the evaluation of the pathological and therapeutic sciences applied by the health team members. In this study, cure part deals with response of the care provided for the study subjects by the researcher ie, reduction in the level of back pain.

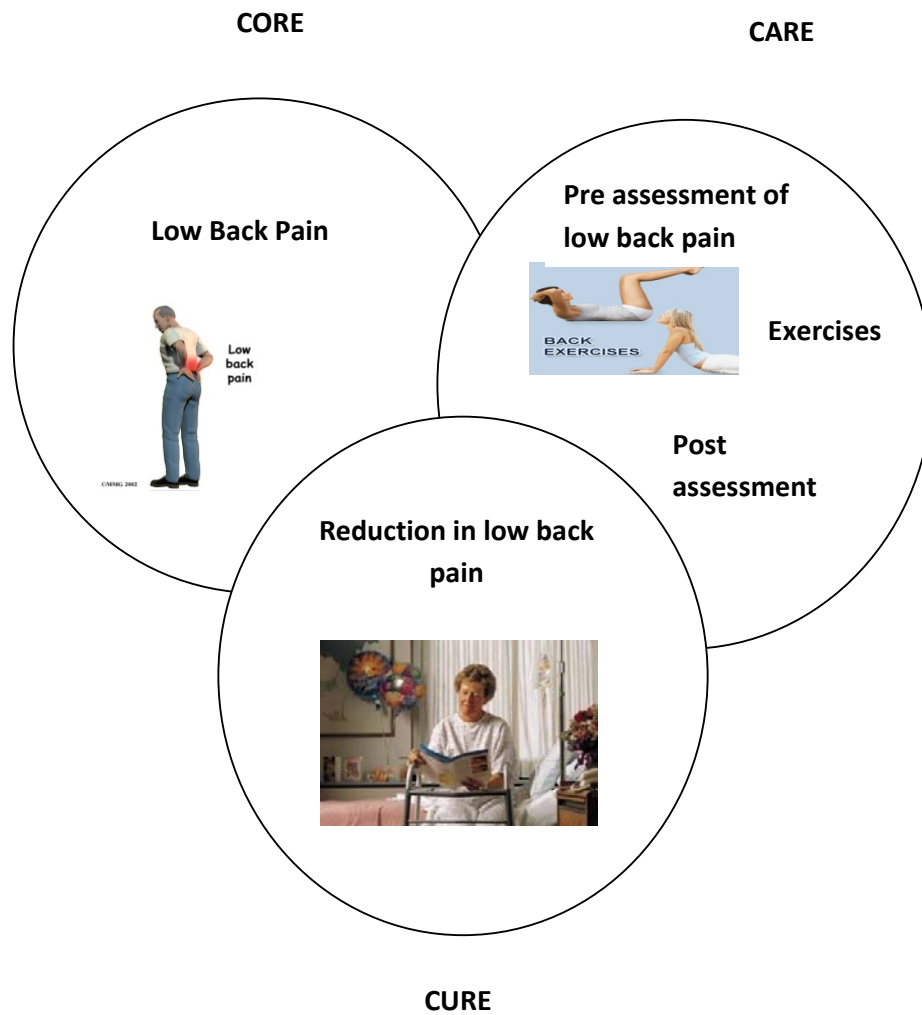


Figure. 1. Conceptual Frame work based on Lydia E Hall core, care, cure Model.

CHAPTER II

REVIEW OF LITERATURE

A literature review helps to lay the foundation for the study and can also inspire new research ideas. Reviewing research literature involves the identification, selection, critical analysis and written description of existing information on the topic of interest.

Review of studies on low back pain and back strengthening exercises are organised in the following headings.

- ✓ **Studies related to incidence and prevalence of low back pain.**
- ✓ **Studies related to health related quality of life and disability due to low back pain.**
- ✓ **Studies related to back strengthening exercises in reducing low back pain.**

Studies related to incidence and prevalence of low back pain

Leah J. Jeffries, Steve F. Milanese, Karen A. Grimmer Somers (2012) conducted an exploratory study to identify the available research literature and to provide an up-to-date synthesis of the epidemiology of idiopathic adolescent spinal pain. A systematic meta-synthesis approach was used to identify secondary review articles and primary epidemiological studies regarding idiopathic adolescent spinal pain. A total of 56 primary cross-sectional studies were identified. The study report revealed that spinal or back pain was the most commonly reported measure with the life time prevalence

figures ranged from 4.7% to 74.4% and the life time prevalence of low back pain ranged from 7% to 72%. Study concluded that life time prevalence rates increase steadily with age and approximate adult levels by around the age of 18 years.

A prospective cohort study conducted by **Rachael.E. Docking, Jane Fleming, Carol Brayne, Jun Zhao, Gary J. Macfarlane, Gareth T. Jones** (2011) in Cambridge city to determine the prevalence of disabling and non-disabling back pain across age in older adults and to identify the risk factors. Participants aged more than or equal to 75 years were interviewed. Relative risks (RRs) and 95% CIs were estimated using Poisson regression. The study revealed that prevalence of disabling and non-disabling back pain was 6 and 23% respectively. The study also pointed that the prevalence of non-disabling back pain did not vary significantly across age (\square^2 : 0.90; $P=0.34$) and the prevalence of disabling back pain increased with age (\square^2 : 4.02; $P =0.04$). New-onset disabling and non-disabling back pain at follow-up was 15 and 5%, respectively. Risk factors found to predict back pain onset at follow-up were: poor self-rated health (RR 3.8; 95% CI 1.8, 8.0); depressive symptoms (RR 2.2; 95% CI 1.3, 3.7); use of health or social services (RR 1.7; 95% CI 1.1, 2.7); and previous back pain (RR 2.1; 95% CI 1.2–3.5). The study concluded that older adults with poor self-rated health, depressive symptoms, increased use of health and social services and a previous episode of back pain are at greater risk of reporting future back pain onset.

Wong.W.S., Fielding.R.C. (2011) conducted a study to determine the prevalence of chronic back pain in the general population of Hong Kong and

to evaluate the relationship of chronic pain with socio-demographic and lifestyle factors and describe the pain characteristics among chronic pain sufferers. A total of 5,001 adults aged ≥ 18 years (response rate 58%) drawn from the general population of Hong Kong. Chronic Pain Grade (CPG) questionnaire was provided and socio- demographic status using telephone interviews. The study revealed that 34.9% reported pain lasting more than 3 months (chronic pain), having an average of 1.5 pain sites; 35.2% experienced multiple pain sites, most commonly of the legs, back, and head with leg and back being rated as the most significant pain areas among those with multiple pain problems. The CPG criteria classified 21.5% of those with chronic pain symptoms as Grade III or above. Fully adjusted stepwise regression analyses identified being female, older age, having part-time employment, existing long-term health problems, higher anxiety scores, and low self-perceived health are significantly associated with chronic pain. The study concluded that chronic back pain is common in the general population of Hong Kong, and the prevalence is highest among women and middle-aged adults.

Jacob. T. (2006) conducted a community based longitudinal study in Israel on low back pain incident episodes. A randomized sample of individuals, free of low back pain at a previous cross-sectional survey were selected for the study. Baseline data included in the study were back pain history, perception of general health, physical activity, smoking, work satisfaction and demographic variables. The study results pointed out that annual incident episodes of low back pain were 18.4% and those who experienced low back pain during the past year had a lower baseline

perception of general health and were less involved in sporting activities than those free of pain. The study concluded that incident episodes of low back pain are relatively high and relate indirectly to baseline perception of general health and to level of sporting activities.

David Cassidy, Pierre Cote, Linda.J. Carroll, Vicki Kristman et al (2005) conducted a study to estimate the incidence and course of severity graded low back pain episodes in the adult population. Population based, prospective cohort study design was used. An incidence cohort of 318 subjects free of low back pain and a course cohort of 792 prevalent cases were formed from respondents to a mailed survey. Incident, recurrent, persistent, aggravated, improved, and resolved episodes were defined by the Chronic Pain Questionnaire. The follow-up at 6 and 12 months was 74% and 62%, respectfully. Annual estimates age and sex were standardized. The study revealed that the cumulative incidence was 18.6% (95% confidence interval CI, 14.2%-23.0%) and most low back pain episodes were mild. Only 1.0% (95% CI, 0.0%-2.2%) developed intense and 0.4% (95% CI, 0.0%-1.0%) developed disabling low back pain. Resolution occurred in 26.8% (95% CI, 23.7%-30.0%), and 40.2% (95% CI, 36.7%-43.8%) of episodes persisted. The study also reported the severity of low back pain increased for 14.2% (95% CI, 11.5%-16.8%) and improved for 36.1% (95% CI, 29.7%-42.2%). Of those that recovered, 28.7% (95% CI, 21.2%-36.2%) had a recurrence within 6 months and 82.4% of it was mild low back pain. Younger subjects were less likely to had persistent low back pain (incidence rate ratio, 0.88; 95% CI, 0.80-0.97) and more likely to have resolution (incidence rate ratio, 1.26; 95% CI,

1.02-1.56). The study concluded that low back pain episodes are more recurrent and persistent in older adult.

Study conducted by **Leboueuf – Yde** et al (1999) to identify the relationship between smoking and incidence and prevalence of low back pain. Forty one original research reports reporting 47 studies published between 1947 and 1966 were systematically reviewed for strength of association. The result pointed out that there was no consistency of statistically significant positive associations between smoking and back pain.

M. Laslett, C.Crothers, P.Beattie, L.Cregten, A.Moses et al (1991) conducted a study to identify the frequency and incidence of low back pain in an Urban New Zealander population. Three hundred and fourteen subjects were assessed by random telephone survey. Relationships between the severity and frequency of low back pain and referred lower extremity pain and other variables such as occupation, recreation, age, sex and predominant working posture was analysed. The study pointed out that point incidence was 17.5%, weekly incidence 33.4%, yearly incidence 63.7% and total incidence 79%. Some 28.3% get frequent minor episodes and 6.4% get frequent severe episodes of low back pain. Study also estimated that 50% suffer the initial episode before the age of 30 years and those suffering low back pain within the last seven days, 14.3% experience reference below the knee and the total incidence of below knee pain was 13.7%. Over half (51.6%) had pain that had lasted seven days or less, but a third had pain for longer than seven weeks. The study concluded that no correlation between the incidence of low back pain and referred pain and occupational posture .

Studies related to health related quality of life and disability due to low back pain

Cesar G. Fontecha , Federico Balague , Ferran Pellise , MLuis Rajmil , Mario Aguirre , Maribel Pasarín et al (2011) conducted a study to assess health-related quality of life (HRQOL) and disability in adolescents with low back pain (LBP) referred to a hospital and compare it with adolescents with and without LBP from the general population. Paired case control study design was used. All consecutive adolescents with nonspecific LBP referred to a hospital outpatient clinic (cases-patients) between January 2006 and October 2007 were compared to two control groups: adolescents with LBP and adolescents without LBP from a representative sample of students. Two controls from each group were randomly paired with each case by city of residence, sex, and age. Cases and controls completed the same self-administered questionnaires, including a generic quality-of-life (KIDSCREEN-52) and two low back pain-specific (Roland-Morris Disability Questionnaire, Hannover Functional Ability Questionnaire) instruments. A group of teenagers with juvenile idiopathic arthritis completing the same questionnaire was used as external reference. The samples were calculated to detect a difference of more than 4.68 units in KIDSCREEN scores. Comparisons were made using *t* tests and effect size estimation. The study pointed out that Patients ($n = 76$) had more frequent ($P = 0.005$) and intense ($P < 0.001$) LBP than adolescents with LBP in the general population ($n = 152$) and a poorer score on the Roland-Morris (5.5 vs. 4.3, $P = .023$) and Hanover (4.5 vs. 3.5, $P = 0.032$) questionnaires. The study concluded that Adolescents with LBP seeking specialized medical attention have better

HRQOL than symptomatic peers from the general population but report worse clinical and functional status.

Sedigheh S Tavafian, Ahmadsreza Jamshidi, Kazem Mohammad , Ali Montazeri (2007) conducted a study on low back pain education and short term quality of life in Iran. A randomized controlled trial approach was used. One-hundred and two female patients with low back pain ($n = 102$) were randomly allocated into two groups, matched in terms of age, weight, education, socioeconomic status, occupation and some aspects of risk behaviour. Group 1 (back school group, $n = 50$) and group 2 (clinic group, $n = 52$) received the 'Back School Programme'. The quality of life using the Short Form Health Survey (SF-36) was assessed at two time points: at baseline and at three months follow-up. The findings were compared both within and between two groups. The study pointed out that The 'Back School Programme' was effective in improving patients' quality of life; significant differences were found on all eight subscales of the SF-36 for group 1. In the clinic group (group 2), improvement was observed on three scales (bodily pain, vitality and mental health) but these improvements were less than in group 1. In group 2, significant improvements were revealed only on three subscales: bodily pain ($P = 0.001$), vitality ($P = 0.02$) and mental health ($P = 0.04$). The mean improvement over all eight subscales of the SF-36 was significantly better for the 'Back School Programme' group. The study concluded that The 'Back School Programme' is an effective intervention and might improve the quality of life over a period of 3 months in patients who experience chronic low back pain.

Tucer.B, Yalcin.BM, Ozturk.A, Mazicioglu.MM, Yilmaz.Y, Kaya.M (2009) conducted a study to investigate the relation of depression and pain-related disability associated with Low Back Pain (LBP) in Turkey. Three thousand and eight hundred samples were randomly selected for the study. The demographic characteristics of the participants (Socioeconomic status, age etc) and low back pain (frequency, intensity, duration) features together with pain-related factors were investigated in responding participants. The participants who had self-reported LBP during the study period were accepted as the study group. The study revealed that 807 (37.1%) of the participants reported that they had low back pain at the time of interview. The study group had a score of 52.91 ± 24.20 mm for visual analogue scale, 52.30 ± 10.67 for the Zung Depression Scale and 24.53 ± 17.22 for the Quebec Back Pain Disability Scale. Age, female gender, smoking (> 20 cigarettes per day), low socio economical status and living in a rural habitat were found to be associated with low back pain. Depression ($P= 0.017$) and disability ($P= 0.002$) were found to be independent risk factors for visual analogue scale. The study concluded that determination of the frequency and intensity of low back pain and related factors is needed for the prevention and management of pain. Mood disorders and self reported restriction in daily activities should be screened in patients with low back pain.

Studies related to back strengthening exercises in reducing low back pain

George.S.Z, Wittmer .V.T, Fillingim. R.B, Robinson. M.E (2011) conducted a study on comparison of back strengthening exercises and graded exposure clinical outcomes for patients with chronic low back pain in Florida. Quasi experimental design was study for the study. Consecutive sample with chronic low back pain were recruited from outpatient chronic pain clinic. Patients received physical therapy supplemented with either back strengthening exercise (n=15) or graded exposure (n=18) principles for 2 weeks. Graded exposure included specific activities that were feared due to back pain and was progressed with a hierarchical exposure paradigm. Tools used were Fear-Avoidance Beliefs Questionnaire, Coping Strategies Questionnaire, and depressive symptoms (Beck Depression Inventory). Primary outcome measures were pain intensity (visual analogue scale) and self-report of disability (modified Oswestry Disability Questionnaire). The study result pointed out that statistically significant improvements ($P<.01$) were observed for pain intensity and disability at discharge. Overall, 50% of patients met criterion for minimally important change for pain intensity, while 30% met this criterion for disability. The study concluded that change in depressive symptoms was associated with change in pain intensity. Physical therapy supplemented with back strengthening exercises resulted in high clinical outcomes for pain intensity and disability.

Ram Prasad Muthukrishnan ,Shweta.D.Shenoy, Sandhu.S. Jaspal, Shankara Nellikunja, Svetlana Fernandes (2010) conducted a study in

Karnataka on the differential effects of back strengthening exercise regime and conventional physiotherapy regime on postural control parameters during perturbation with movement and control impairment in chronic low back pain patients. Interventional approaches were used based on sub-groups of chronic low back pain . Sequential and pragmatic control trial methods were used in this study. Three groups of participants were investigated during postural perturbations: 1) CLBP patients with movement impairment (n = 15, MI group) randomized to conventional physiotherapy regime 2) fifteen CLBP patients with control impairment randomized to back strengthening exercises (CI group) and 3) fifteen healthy controls (HC). The results revealed that the MI group did not show any significant changes in postural control parameters after the intervention period however they improved significantly in disability scores and fear avoidance belief questionnaire work score ($P < 0.05$). The CI group showed significant improvements ($p < 0.013$, $p < 0.006$, and $p < 0.002$) respectively with larger effect sizes: (Hedges's $g > 0.8$) after one week of back strengthening exercises for the adjusted p values. Postural control parameters of HC group were analyzed independently with pre and post postural control parameters of CI and MI group. This revealed the significant improvements in postural control parameters in CI group compared to MI group indicating the specific adaptation to the back strengthening exercises in CI group. The study also pointed out that though the disability scores were reduced significantly in CI and MI groups ($p < 0.001$), the post intervention scores between groups were found significant ($p < 0.288$). Twenty percentage absolute risk reduction in flare-up rates during intervention was found in CI group (95% CI: 0.69-

0.98). The study concluded that back strengthening exercise group demonstrated significant improvements after intervention.

Machado.L.A., AzevedoD.C., Capanema.M.B., NetoT.N., CerceauD.M. (2007) conducted a study in Brazil regarding the effectiveness of psychotherapy, based on client- centered therapy and exercise for patients with chronic non specific low back pain. Thirty three patients with chronic non specific low back pain were recruited and randomized to receive client centered therapy(N=16) or exercise (N=17) for 9 weeks. Pain and disability were measured by a 10 cm visual analogue scale and by the Brazilian – Roland Morris Questionnaire. The results revealed the exercise group showed greater improvement than psychotherapy and the difference between the groups were statistically and clinically significant for disability at 9 weeks (4.9 points,95% CI-9.08 to -0.72). Study concluded that client- therapy is less effective than exercise in reducing disability at short term.

A clinical study conducted by **Hides J.A., Richardson C.A., Jull G.A.,** (1996) on the multifidus muscle recovery after resolution of first episode low back pain. Thirty nine subjects with acute, first- episode, unilateral low back pain and unilateral segmental inhibition of the multifidus were selected for the study. Patients in group 1 received medical treatment only. Patients in group 2 received medical treatment and specific, localized exercise therapy. Out come measure for both groups included 4 weekly assessments of pain, disability, range of motion and size of multifidus cross- sectional area. Patients were reassessed at a 10- week follow- up examination. The study reported that

muscle recovery was more rapid and more complete in patients in group 2 who received exercise therapy.

A comparative study conducted by **Mooney.V., Kron.M., Rummerfield.P.,Holmes.B.** (1995) on the effect of once a week exercise program for 20 weeks in volunteered and non volunteered workers to exercise . The study result pointed out that there was a 54% to 104% increase in strength during a 20 week program and the incidence of back injuries was reduced in exercise groups than non exercised groups. And the study concluded that a significant increase in strength associated with the exercise program correlated with the greatly reduced incidence of back claims.

Nelson.B.,O'Reilly.E.,Miller.M.,Hogan.M.,Wagner.J.,Kelly.C.(1995) conducted a study regarding the clinical effects of Intensive, Specific exercise on Chronic low back pain. Eight hundred and ninety five consecutive chronic low back patients were evaluated. Six hundred and twenty seven completed the program. Intensive specific exercise was given to the experimental group. The study result pointed out that 76% of patients completed the program had excellent results and at 1 year follow up, 94% of patients reported good than in the control group.

A study conducted by **Gundewall B.etal** (1993) in U.S.A. to determine whether a program designed to improve back strength, endurance and coordination would affect the occurrence of low back pain among nurses and nurses aides in geriatric hospital. Sixty- nine subjects were randomized into a group into a training group (N=28) or a control group (N=41). The study

results revealed that subjects in the training group showed a significant increase in back muscle strength.

Pollock et al (1992) conducted a study on the effects of isolated lumbar extension resistance training. A group of elderly subjects 60 to 80 years of age were randomized into a training group (N=17) that performed one set of 10 to 15 lumbar extensions to muscle fatigue one time per week and a control group (N=6). Before and after the 6 month study period ,subjects were assessed for lumbar extension strength and lumbar Bone mass density. The study results indicated a significant improvement in both lumbar strength and bone mass density in the training group,while the control group showed no change.

In a study conducted by **TucciJ.,Carpenter D.,Pollock.M., Graves.J.,Leggett. S.** (1992) on the effect of reduced frequency of training and detraining on lumbar extension strength. Fifty subjects were recruited from ongoing strength training programs. Initial training consisted of 10 to 12 weeks of variable resistance lumbar extension strength exercise to volitional fatigue 1,2 or 3 times a week. Subjects were reduced the frequency of training to once every 2 weeks or every 4 weeks. The study result revealed that reduced training group showed no significant reduction in lumbar extension strength, where as the detraining group reported an average 55% reduction in strength.

Sherry V.Risch, Michael.L.Pollock, Howard Langer, James E.Graves, Nancy K. Norvell, Edward D. Risch et al (1990) conducted a study in Florida on physiological and psychological benefits of lumbar

strengthening in chronic low back pain patients. Fifty four low back pain subjects were randomly assigned to a 10- week exercise program (N=31) or a wait list control group (N=23). The study results indicated a significant increase in isometric lumbar extension strength for the treatment group and reduction in pain compared with the control group ($P<0.05$). Experimental group reported less physical and psychological dysfunction whereas the control group reported increased pain and physical and psychological dysfunction. The study concluded that lumbar extension exercise is beneficial for strengthening the lumbar extensors and results in decreased pain and improved perceptions of physical and psychological functioning in chronic low back pain patients.

CHAPTER III

METHODOLOGY

Research methodology is a systematic way of solving problem. This chapter deals with the research approach, research design, the setting, sample, technique, description of tool and plan for data analysis.

Research approach

To accomplish the objective the research approach used for the study was quantitative approach.

Research design

The design used in this study was Quasi experimental, 2 group pre test – post test design.

The design can be represented as follows:-

E – $O_1 \times O_2$

C – $O_1 - O_2$

E – Experimental group

C – Control group

O₁ – Pretest to assess the level of low back pain

X – Implementation of back strengthening exercises

O₂ – Post test to assess the level of low back pain

Setting of the study

The study was conducted in Sree Mookambika Medical College Hospital, which is a 500 bedded multispeciality hospital. The average census of low back pain patients in OPD ranges from 90 to 100 per month. The investigator selected the setting because the college and hospital is situated in the same campus.

Variables

Independent variable – Back strengthening exercises

Dependent variable – Low back pain

Population

Population for the study was all patients who were diagnosed with low back pain within the age group of 20 to 60 years attending Sree Mookambika Medical College Hospital.

Sample size

Sample consisted of 60 Low back pain patients who satisfied the criteria for sample selection. Out of 60 subjects, 30 were allotted to experimental group and 30 were allotted to control group.

Sampling Technique

Purposive sampling was adopted for the present study.

Sample selection Criteria**Inclusion criteria**

- ✓ Patients between the age group of 20 to 60 years
- ✓ Patients who were willing to participate in the study.
- ✓ Patients diagnosed as low back pain with mild to moderate pain score.

Exclusion criteria

- ✓ Clinical indicators of restricted movements
- ✓ History of psychosis or major alcohol misuse.
- ✓ Patients who were diagnosed with severe cardiovascular problems.
- ✓ Pregnancy

Description of the tool

The tool consists of two parts Section A and Section B.

Section A

Section A deals with demographic variables such as age, gender, educational status, occupation and body built.

Section B

This section deals with the assessment of low back pain by Aberdeen Low Back Pain Scale. This scale was created by Rutta. D. A. and Garratt.A.M., from the University of Aberdeen and from the Aberdeen Royal Infirmary in Scotland. It is provided by the Centre based evidenced physiotherapy in Netherlands, 1994. It consists of 19 questions and the total score is 75.

Validity and Reliability

Validity of tool was established from five experts. Four experts from the field of medical surgical nursing and one from the medical officer.

The authors found the instruments valid and reliable. The reliability of the tool was assessed by test- retest method. This method was calculated by Spearman's rank correlation and found as $r = 0.86$.

Pilot study

Pilot study was conducted on similar population to identify and foresee unnoticed problems that may arise during the course of study. Pilot study was conducted in S.U.T. Hospital , Trivandrum. Findings showed that the study was feasible and practicable.

Data collection Procedure

Data collection period was four weeks for the main study. Formal permission was obtained from the hospital authorities.

Patients who were diagnosed with low back pain were selected. Pre- assessment was done with Aberdeen Low Back Pain Scale for back pain patients and then mild to moderate level of back pain were selected as study samples. And they were allotted to experimental and control group using purposive sampling technique. Then the investigator taught/demonstrated back strengthening exercises for the samples in the experimental group. After implementation the investigator made the samples to practise the same for duration of 30 minutes for 7 days and also insisted them to practice the same for twice a day. Then post assessment was done on the 15th day with the same tool.

Plan for data analysis

The data was organised, tabulated, summarized and analyzed by using descriptive and inferential statistical analysis. To compare experimental and control group, student 't' test was used. Association between level of back pain and demographic variables were tested using chi-square test.

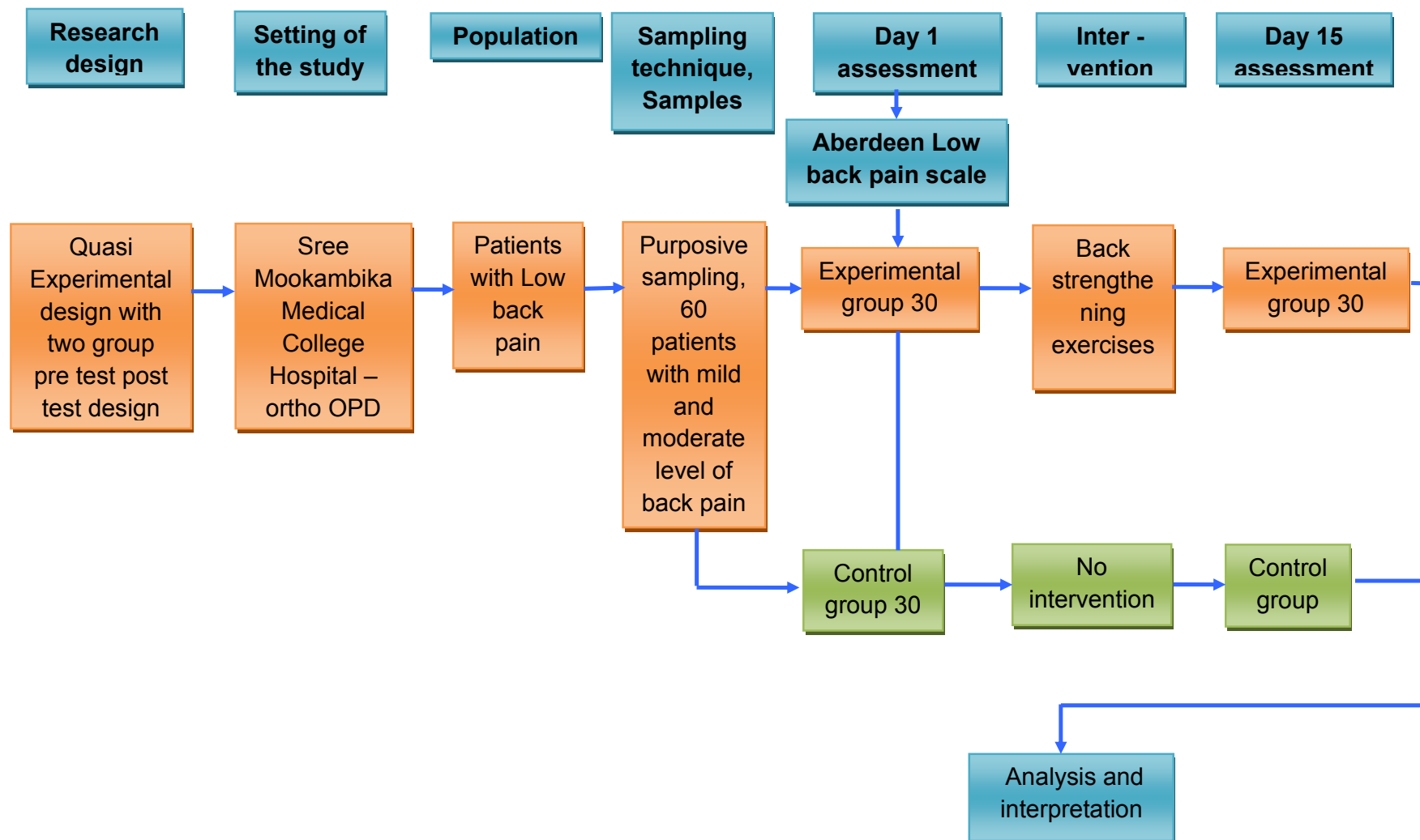


Fig. 2. Schematic Representation of Research Design

CHAPTER IV

DATA ANALYSIS

The study was conducted to assess the effectiveness of back strengthening exercises in reducing low back pain . A quantitative approach was used for the study. Two group pretest - post test design was adopted.

The data obtained were analyzed by both descriptive and inferential statistics. The test scores were analyzed by statistical mean and standard deviation. The significance of the difference of mean scores were interpreted by students 't' test. The association between demographic variables and low back pain were studied by chi square test (χ^2).

The Objectives of the Study were

1. To determine the effect of back strengthening exercises in reducing low back pain among patients in experimental and control group.
2. To find out the association between the level of pain with selected demographic variables such as age, gender, education, occupation and body built.

The data was tabulated and presented as follows.

Section: A

This section displays the demographic variables of patients selected for the study. (Table 1:)

Section: B

This section deals with both:-

- The effect of back strengthening exercises in reducing low back pain.(Table 2: a)
- The mean reduction of low back pain in experimental group after performing back strengthening exercises with control group.
.(Table 2: b)

Section: C

This section deals with association of low back pain and selected demographic variables. (Table 3:)

Section: A

This section deals with the demographic variables of the subjects selected by the investigator.

Table 1:

Distribution of study subjects and matching them for the selected demographic variables

N=60

Demographic variables	Experimental group		Control group		χ^2
	F	%	F	%	
Age					
20-30	6	20	4	13.3	0.525
30-40	8	26.6	9	30	
40-50	7	23.3	8	26.6	
50-60	9	30	9	30	
Sex					
Male	10	33.33	18	60	4.286
Female	20	66.67	12	40	
Educational Status					
Literate	14	46.67	15	50	0.067
Illiterate	16	53.33	15	50	

Table 1 continued

Demographic variables	Experimental group		Control group		χ^2
	F	%	F	%	
Body Built					
Lean	10	33.33	8	26.67	1.752
Moderate	10	33.33	15	50	
Obese	10	33.33	7	23.33	
Occupation					
Heavy worker	8	26.67	7	23.33	0.622
Moderate	12	40	15	50	
Sedentary	10	33.33	8	26.67	

The above table1 describes the distribution in number and percentage of study subjects according to their demographic variables. Majority of the subjects were (20)females ie, 66.6%. Among the total samples, 53.3% of the subjects were illiterate. The percentage distribution based on occupation reveals that 40-50% of the subjects were engaged in moderate work. While considering the body built 50% of the study subjects were having moderate body weight. From the above table, it is observed that the experimental and control group were matched in their age, sex, occupation, education and body weight.

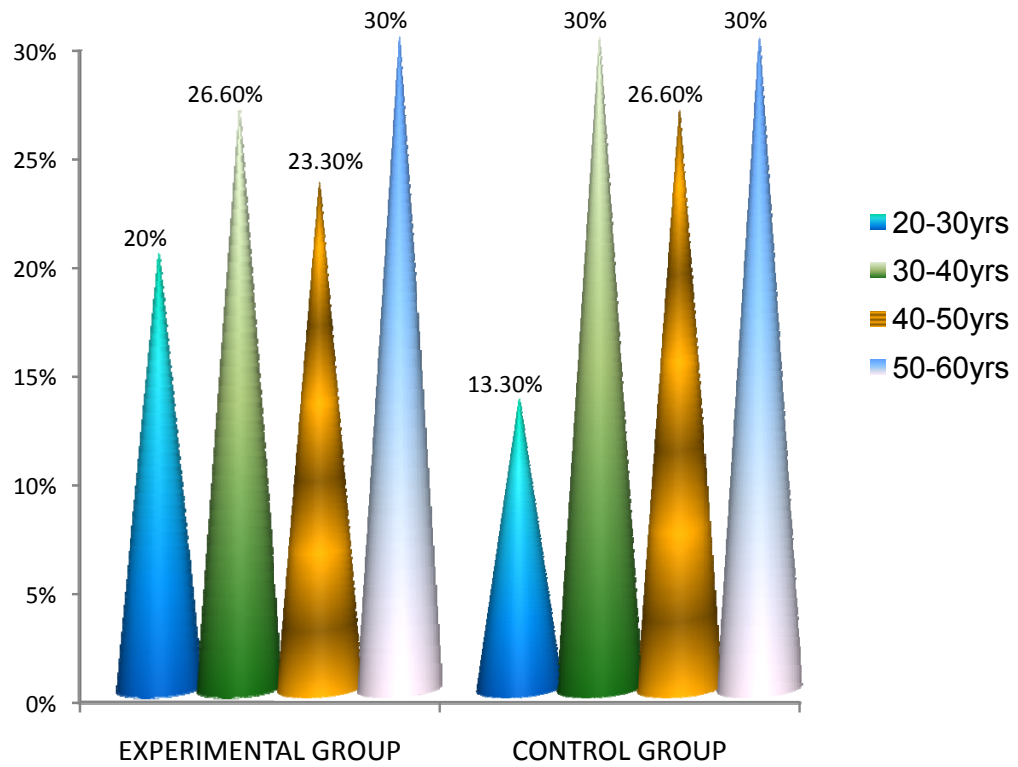


Figure .3. Distribution of demographic variables according to age.

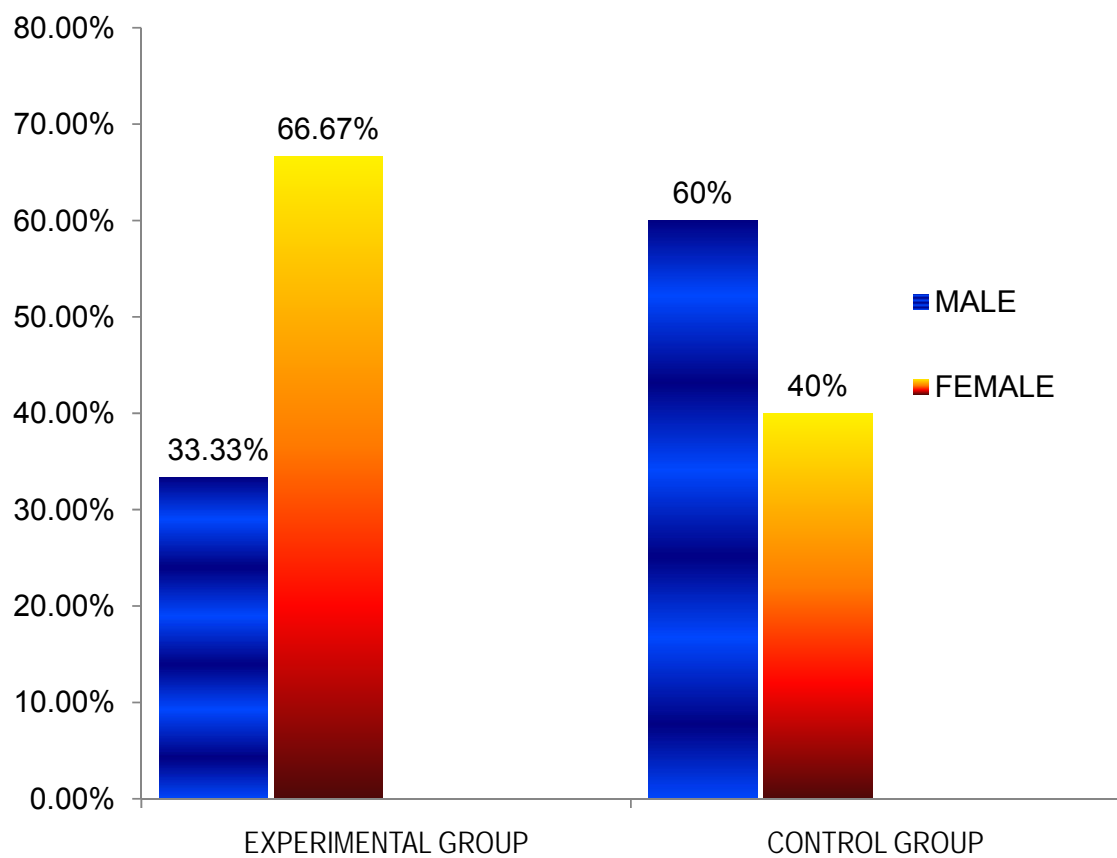


Figure. 4. Distribution of demographic variables according to sex.

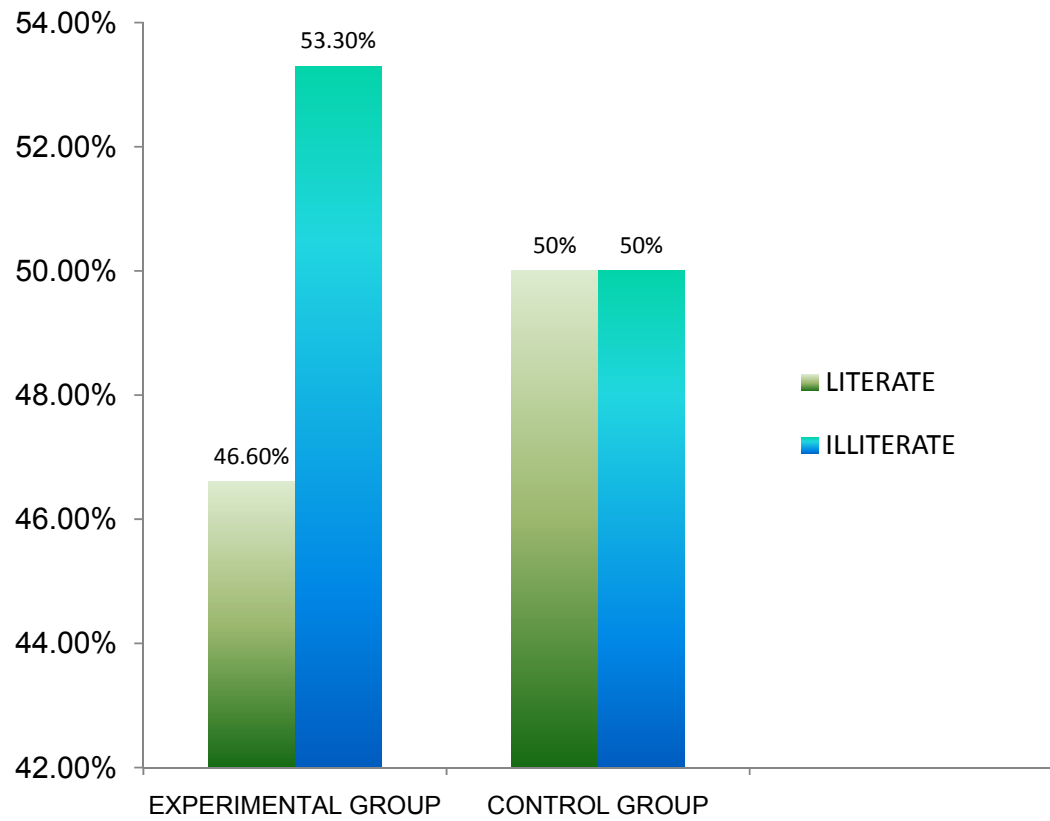


Figure. 5. Distribution of demographic variables according to educational status.

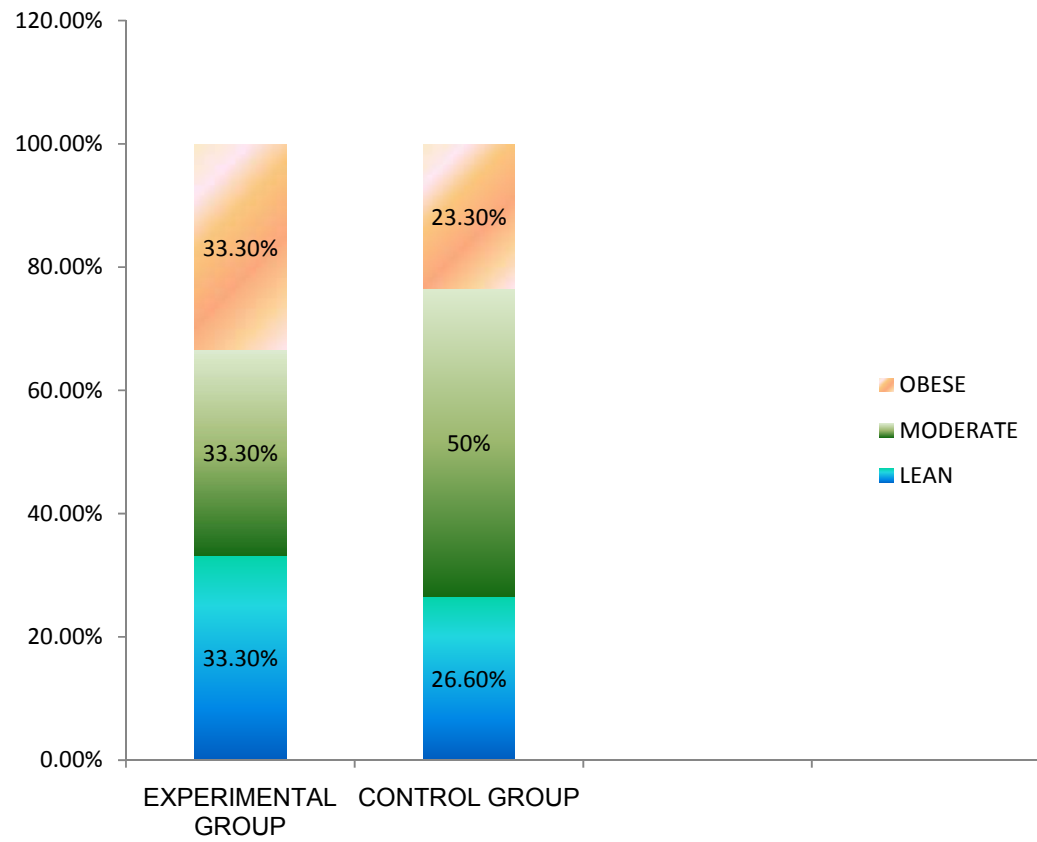


Figure. 6. Distribution of demographic variables according to body built.

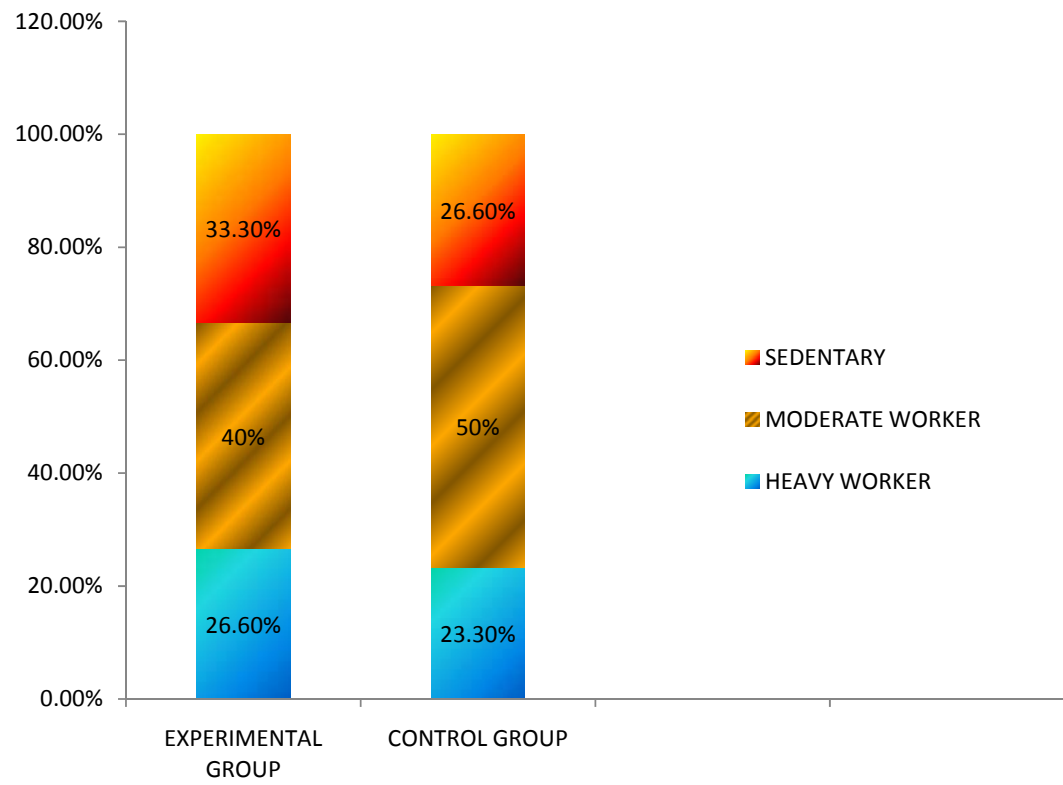


Figure. 7. Distribution of demographic variables according to occupation.

Section: B

Table 2:a

Effectiveness of back strengthening exercises in reducing the level of back pain in experimental and control group.

N=60

Study group	Pre test		Post test		Reduction in back pain		't'	df
	Mean	SD	Mean	SD	Mean	SD		
Experimental group	37.2	3.21	33.5	2.61	3.7	0.6	10.35*	29
Control group	37.7	2.45	35.2	2.92	2.5	0.98	5.837*	29

*significant at $p < 0.05$

The above table 2:a shows the effectiveness of back strengthening in reducing the level of back pain in experimental group and control group. The reduction of back pain from pretest to post test among experimental group was 3.7 ± 0.6 and the same of control group was 2.5 ± 0.9 . The mean reduction in the experimental group was statistically highly significant ($t=10.35$, $df=29$ and $P < 0.05$). Similarly the mean reduction in control group was also statistically significant ($t=5.837$, $df= 29$ and $P < 0.05$).

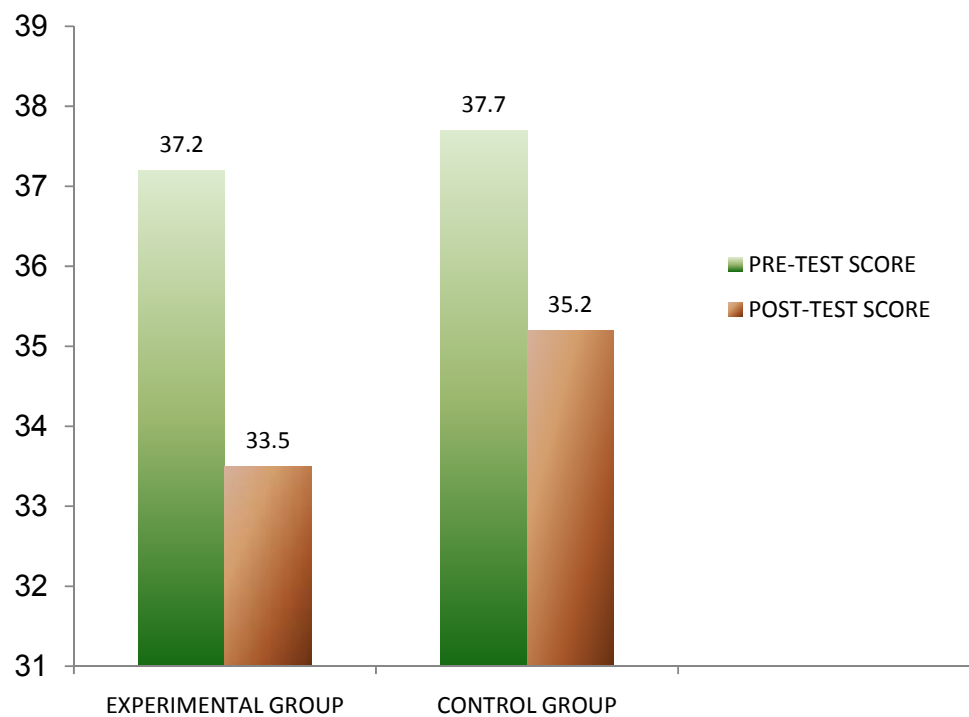


Figure. 8. Comparison of mean low back pain scores of experimental and control group.

Table 2:b

The mean reduction of low back pain in experimental group after performing back strengthening exercises with control group.

N=60

Groups	Mean reduction		Difference of mean	‘t’	df
	Mean	SD			
Experimental group	3.7	0.6	1.2	6.11*	58
Control group	2.5	0.98			

*Significant at $p < 0.05$

The table 2:b explains the mean reduction was greater in experimental group, with a difference of mean reduction of 1.2 between the two groups. The difference was statistically highly significant ($t=6.11$, $df=58$ and $P<0.05$). This shows that the experimental group had significantly greater reduction in low back pain levels compared to the control. So the research hypothesis (H_1) being supported.

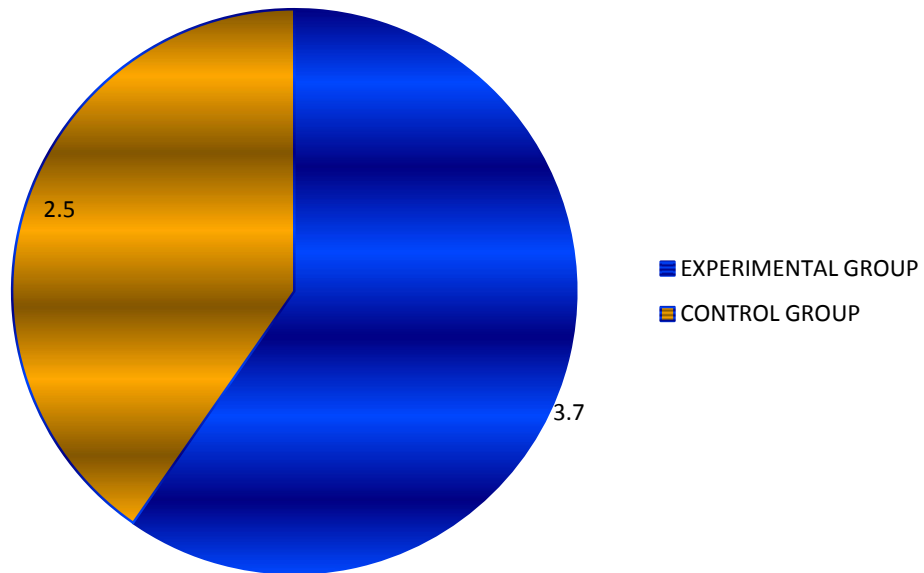


Figure. 9.Mean reduction of low back pain in experimental group after performing back strengthening exercise with control group.

Section: C

This section deals with level of low back pain and demographic variables and to find out the association between the level of low back pain and selected variables such as age, sex, education, occupation and body weight.

Table 3: Association between the level of low back pain and selected demographic variables.

Demographic variables	Association with low back pain
	χ^2
Sex	1.685
Age	1.234
Education	.202
Occupation	.491
Body weight	.079

The above table 3 describes the association between the level of back pain with demographic variables both in experimental and control groups. The table clearly shows that there is no association between the level of back pain and selected demographic variables. So the research hypothesis (H₂) was not supported.

CHAPTER – V

DISCUSSION

The study was undertaken to determine the effectiveness of back strengthening exercises in reducing low back pain among patients attending Sree Mookambika Medical College Hospital. Quasi experimental design was adopted with two group pre test – post test design for the study. The level of low back pain was assessed by Aberdeen Low Back Pain scale. The result and discussion of the study are based on the findings obtained from the statistical analysis.

The first objective of the study was to determine the effect of back strengthening exercises in reducing low back pain in experimental group and control group.

Distribution of selected characteristics of the study subjects.

The demographic variables of experimental and control group were matched in their sex, age, education, occupation and body built.(Table 1:)

The degree of low back pain was assessed in patients before and after back strengthening exercises. The pre and post test level of low back pain of both groups were compared and found that the study group had reduction in back pain from pre-test to post-test as 37.2 ± 3.21 (S.D) to 33.5 ± 2.61 respectively, with a mean score reduction of 3.7 ± 0.6 . The degree of low back pain among control group also reduced from pretest to post test as 37.7 ± 2.45 to 35.2 ± 2.92 respectively, with a mean score reduction of $2.5 \pm .98$ (Table2:a)

The mean reduction of level of back pain of both groups were compared and found that the mean reduction of back pain of experimental group was significantly greater than that of control group ie. $3.7 \pm .6 > 2.5 \pm .98$ with the difference of 1.2 mean scores. ($t=6.11$, $df= 58$, $P<0.05$). There was significant reduction in the level of back pain in experimental group receiving back exercises, and the mean reduction in the level of low back pain was very much higher in experimental group than in control group. Thus the research hypothesis, H_1 is accepted. Back strengthening exercises was found to be very effective in reducing low back pain. (Table 2:b)

This study result is consistent with the study conducted by **Ram Prasad Muthukrishnan ,Shweta.D.Shenoy, Sandhu.S. Jaspal, Shankara Nellikunja, Svetlana Fernandes** (2010) in Karnataka on the differential effects of back strengthening exercise regime and conventional physiotherapy regime on postural control parameters during perturbation with movement and control impairment in chronic low back pain patients. Interventional approaches were used based on sub-groups of chronic low back pain . Sequential and pragmatic control trial methods were used in this study. Three groups of participants were investigated during postural perturbations: 1) CLBP patients with movement impairment ($n = 15$, MI group) randomized to conventional physiotherapy regime 2) fifteen CLBP patients with control impairment randomized to back strengthening exercises (CI group) and 3) fifteen healthy controls (HC). The results revealed that the MI group did not show any significant changes in postural control parameters after the intervention period however they improved significantly in disability scores and fear avoidance belief questionnaire work score ($P < 0.05$). The CI group

showed significant improvements ($p < 0.013$, $p < 0.006$, and $p < 0.002$) respectively with larger effect sizes: (Hedges's $g > 0.8$) after one week of back strengthening exercises for the adjusted p values. Postural control parameters of HC group were analyzed independently with pre and post postural control parameters of CI and MI group. This revealed the significant improvements in postural control parameters in CI group compared to MI group indicating the specific adaptation to the back strengthening exercises in CI group. The study also pointed out that though the disability scores were reduced significantly in CI and MI groups ($p < 0.001$), the post intervention scores between groups were found significant ($p < 0.288$). Twenty percentage absolute risk reduction in flare-up rates during intervention was found in CI group (95% CI: 0.69-0.98). The study concluded that back strengthening exercise group demonstrated significant improvements after intervention.

The study finding is also congruent with study conducted by **Machado.L.A., AzevedoD.C., Capanema.M.B., NetoT.N., CerceauD.M.** (2007) in Brazil regarding the effectiveness of psychotherapy, based on client- centered therapy and exercise for patients with chronic non specific low back pain, in which the results revealed that the exercise group showed greater improvement than psychotherapy and the difference between the groups were statistically and clinically significant for disability at 9 weeks(-4.9 points, 95% CI-9.08 to -0.72). Study concluded that client- therapy is less effective than exercise in reducing disability at short term.

The second objective of the study was to find out the association of level of back pain and selected demographic variables in experimental and control group.

There was no significant association observed between the level of back pain and selected demographic variables. Thus the research hypothesis, H_2 is rejected. (Table 3:)

CHAPTER – VI

SUMMARY AND RECOMMENDATION

Summary of the study

This study was undertaken to determine the effect of back strengthening exercises in reducing low back pain among patients attending Sree Mookambika Medical College hospital at Kanyakumari district.

Objectives of the study

1. To determine the effect of back strengthening exercises in reducing low back pain among patients in experimental and control group.
2. To find out the association between the level of pain with selected demographic variables such as age, gender, education, occupation and body built.

Hypotheses

H₁ – There is a significant reduction in the mean pain score of patients in experimental group than in control group.

H₂ – There is a significant association between with the level of pain and selected demographic variables.

The researcher used a quantitative approach with two group pretest post test design. The researcher has adopted Lydia.E.Hall core, care, cure model as conceptual framework. A pilot study was conducted to determine the

practicability and feasibility of the study. It is proved that the study was feasible and practicable.

The study was done on 60 Low back pain patients with mild to moderate level pain. In this study, the independent variable is the administration of back strengthening exercises and dependent variable is the level of back pain. The subjects were selected by purposive sampling technique and 30 were allotted to experimental and control group.

The tool used for the study was Aberdeen Low Back pain scale. Pre test was conducted in experimental and control group on the first day using Aberdeen Low Back pain scale . Back strengthening exercises was given to the experimental group for a duration of 7 days. Post test was conducted to the experimental and control group on the 15th day. The collected data were analyzed based on descriptive and inferential statistics according to the above mentioned objectives.

The study identified that level of back pain was reduced in both experimental and control group. It was found that there was a significantly high reduction in the level of pain of experimental group after back strengthening exercises than in the control group. The 't' value of difference of mean reduction of low back pain tabulated was found to be $t = 6.11$, $df = 58$, $P < 0.05$.

Study findings

The pretest of back pain among experimental and control group revealed no significant difference. So the two groups were identical.

The study revealed that level of low back pain was reduced in both experimental and control group. It was found that there was a significantly high reduction in the level of low back pain in experimental group after the performance of back strengthening exercises than in the control group. The 't' value of difference of mean reduction of back pain tabulated was found to be 't' = 6.11, df=58, P<0.05.

This definitely shows that back strengthening exercises was very much effective and beneficial in reducing back pain among Low back pain patients.

In this study there was no association found between the level of back pain and selected demographic variables such as age, sex, education, occupation and body built.

Nursing Implications

Low back pain is one of the most disturbing symptoms in all aged group patients. Now a day's so many conventional management modalities are available. Use of NSAIDS, drugs and surgeries can lead to many side effects. All these modalities provide only us some short term relief. Repeated hospital stay, side effects of drugs and disturbance of day today activities all can affect the psyche of patients adversely. This often requires a nursing intervention which has no side effects.

Back strengthening exercises can remodel and recondition the soft tissues and bones there by providing strength, support and reduction in pain. Present study proves the effect of back strengthening exercises in reducing low back pain. Therefore the findings of the study has considerable implications on nursing administration, nursing practice and nursing research.

Implications to nursing administration

- i) This study helps the nurse administrator to assess the knowledge of nurses regarding complementary and alternative therapies.
- ii) The result of the study encourages the nurse administrator to conduct in service education programs on various types of exercises in reducing low back pain.
- iii) Nurse administrator can prepare the protocol regarding each exercise sessions .
- iv) This helps the nurse administrator to develop and provide an effective non pharmacological measure for relieving low back pain.
- v) Nurse administrators can create awareness among nurses that exercise is a very good cost – effective nursing intervention to relieve low back pain.
- vi) This study is cheap, raises the reputation and popularity of the hospital and patient satisfaction.

Implications to nursing education

Alternative and complementary therapies can be integrated as an adjuvant on to the existing therapies in the nursing curriculum.

- i) Nurse educator can train and encourage the student nurses to implement exercises as a complementary and alternative therapy.
- ii) This study can motivate student nurses to explore new strategies for effective relief of back pain.
- iii) This research report can be kept in library for reference of nursing personnel and other health care professionals.
- iv) The nurse educator can take independent decision based on principles of healthcare.

Implications to nursing practice

- i. Performance of back strengthening exercises is a safe and better modality.
- ii. This intervention could bring benefits to both patients who are on pharmacological therapy and not on the same.
- iii. It also brings a long term effect and higher level of reduction of pain thus patient feels better and can avoid complications.

Implications to nursing research

The research implication of the study lies in the scope for expanding the quality of nursing service. In this era of evidence based practice, publication of these studies will take nursing to a new horizon.

- i. Nurse researcher can do studies related to strengthening exercises on low back pain patients in reducing back pain.
- ii. Nurse researcher can do studies related to other beneficial effects of exercises.
- iii. A comparative study can be done to determine the effectiveness of exercises with other conventional therapies.
- iv. Similar study can be conducted on a large sample so it could be generalized.

Limitation

- i. The sample size of patients for the experimental and control group was only 30 and hence generalization is not possible.
- ii. Sample attrition was there.
- iii. Extraneous variables are controlled to some extent only.
- iv. Intervention was given only for 7 days.

Recommendations

- I. The study may be replicated with randomization in selection of a larger sample.
- II. Nurse researcher can do studies related to strengthening exercise in joint pain.
- III. Studies can be done to determine the other therapeutic benefits of exercises among Low back pain patients.
- IV. A study can be conducted by including more number of variables and at different geographic locations.
- V. Nurse researcher can do studies related to effect of exercises on quality of life.

Conclusion

The conclusion drawn from the findings of the study are as follows:-

- i. Back strengthening exercises are found to be an effective nursing intervention in reducing back pain among patients with Low back pain.
- ii. Strengthening exercise are found to have no side effects when compared with other pharmacological treatment.

- iii. The findings of the study enlighten the fact that exercises can be used as a cost effective nursing intervention in relieving back pain among patients.
- iv. The demographic variables did not show any association with back pain of both groups.

BIBLIOGRAPHY

Books

- 1) Barbara Hazard Munro., (1997). Statistical Methods for Health Care and Research. (3rd ed.) Newyork: Lippincott. 99
- 2) Basavanthappa, B.T., (2007). Nursing Research. (2nd ed.) New Delhi : Jaypee Brothers Medical Publishers. 437
- 3) Christensen., Kockrow., (2006). Adult Health Nursing. (5th ed.) Missourie: Mosby Elsevier. 481-482
- 4) David, J .Dandy.,Dennis,J.Edwards.,(1998). Essential Orthopaedics and Trauma. (3rd ed.) New York: Churchill Livingstone Publishers. 435-437
- 5) Denise, F. Polit., Bernadette, P. Hungler., (1997). Essentials of Nursing Research, Methods, Appraisal and Utilisation. (4th ed.) Philadelphia: Lippincott. 149
- 6) Donna, D. Ignatavicius., Linda Workman. M., (1995). Medical Surgical Nursing a Nursing Process Approach. (2nd ed.) Philadelphia: W.B. Saunder's Company. 2052-2066
- 7) Francis Donovan Monahan., (2009). Phipp's Medical Surgical Nursing Health and Illness Perspectives, (8th ed.) Missourie: Mosby Elsevier. 961

- 8) Frank, C. Wilson., Dauglas, R. Dirschl.,(2001). Self assessment and Review Orthopaedics. (1st ed.) San Francisco : Mc Graw – Hill Publishers. 45

- 9) George, B.J., (1990). Nursing Theories, The Base For Professional Nursing Practice. (4th ed.) New Jersey: Appleton And Longe. 215-230

- 10) Geri Lobiando Wood., Judith Haber., (2006). Nursing Research, Methods and Critical Appraisal For Evidenced Base Practice. (6th ed.) St.Louis: Mosby Elsevier Publications. 263

- 11) James, A. Fain., (1999). Reading, Applying And Understanding Nursing Research. (2nd ed.) Philadelphia: F. A Davis Company. 87

- 12) Laura, A. Talbot., (1995). Principles and Practice of Nursing Research. (1st Ed.) St Louis: Mosby. 114

- 13) Leonine, Burke., (2000). Medical and Surgical Nursing, Critical Thinking in Client Care. (2nd ed.) Boston: Pearson Custom Publishing. 882-895

- 14) Lynn, S. Lippert.(2000) . Clinical Kinesiology for Physical Therapist Assistants. (3rd ed.) New Delhi : Medical publishers. 101

- 15) Mahajan, B. K., (2010). Methods in Biostatistics for Medical Students and Research Workers. (7th ed.) USA: Jaypee Brothers and Medical Publishers. 117

- 16) Marilyn, J. Wood., (20011). Basic Steps in Planning Nursing Research.
(1st ed.) Massachusetts: Jones And Bartlett Publishers. 247
- 17) Midre,A. Mason., Grace Fleet Bates., (1992). Basic Medical Surgical Nursing. (5th ed.) New York: Mc Graw Hill Jn, Health Professions Division. 619
- 18) Prabhakara, G. N., (2006). Biostatistics. (1st ed.) New Delhi: Jaypee Brothers Medical Publishers. 162
- 19) Rose Marie Nieswiadomy., (1993). Foundations of Nursing Research.
(2nd ed.) Norwalk: Appleton Longe. 169
- 20) Sandy Fritz., (1999). Mosby's basic Science for soft tissues and Movement therapies. (3rd ed.) Philadelphia. 291-292
- 21) Sharon Mantik Lewis., (1996). Medical Surgical Nursing- Assessment and Management of Clinical Problems. (4th ed.) St Louis: Mosby. 1357-1360
- 22) Spring House., (1998). Mastering Medical Surgical Nursing. (1st ed.) Pennsylvania: Spring House Corporation. 455
- 23) Suresh Sharma, K., (2011). Nursing Research and Statistics. (1st ed.) New Delhi: Elseveir. 81

Journals

1. Cesar G. (2011).Low back pain in adolescents. Journal of spine, 36(17) , 58-65
2. Dickinson, E. (2006).Low back pain relieved by exercises. Journal of Complementary and alternative medicine, 12(7), 82-84.
3. George SZ. (2008). Comparison of back strengthening exercises and graded exposure. Journal of Physical therapy, 9(6) 22-23
4. Harris, R.E. (2005). Using positions to modify alertness in the classroom. Journal of alternative complimentary medicine, 11(4), 673-679.
5. Huashan., Schiao Chi., & Lichan. (2004).Effectiveness of muscle strengthening in improving pain. Journal of advanced nursing, 45(3) , 252-259.
6. Jabez, S .,Kavitha., & Amirudeen . (2000). Positions in the practice of nursing. Nightingale nursing times, 4(2),36-38.
7. Jacob T. (2005). Characteristics of a population of back pain patients identified from a population based study. Journal of orthopaedics medicine, 99(8), 46-49.
8. Jindal, S.K., (2006). Mechanical Low back pain in India Indian journal of medicine, 124(6), 19-21.

9. Kua Chia., Lin Shiow., Luan Tsay., & Juci Chin Wang. (2003). Effects of complimentary therapy for patients having prolonged mechanical ventilation support. Journal of clinical nursing, 18(2) , 128-138.
10. Larissa, M. S. (2010). Patient education programmes and improvement in exercises. Nightingale nursing Times, 63, 42-44
11. Lee, M.K., Chag, S.B., & kang, D.H., (2004). Effect of exercise on labor pain and length of delivery time in women during labour. Journal of alternative and complementary medicine, 24(2) , 959-965.
12. Mohanal., & Judie,A. (2000). Assessment of effectiveness of exercises on labour outcome among primi parturient mothers. Nightingale nursing times, 4(8), 18-20.
13. Muthamiselvi,G. (2010). Complementary therapies for pain Nightingale nursing times, 6(4), 12-18.
14. Nafsia Fidvi,.(2010). Physiotherapy management of low back pain in India. Journal of Physiotherapy, 10(5) 14.
15. Peter, F. Ullrich,(2009). Back strengthening exercises. Journal of spine, 28(7),19.
16. Rainville J. (2007). Exercise as a treatment for chronic Low back pain. Journal of spine, 30 ,813-825
17. Rekha, M.D. (2010). Effectiveness of exercise (LI 14) for the reduction of low back pain. Nightingale nursing times, 5(12),27-28.

18. Sharma. (2007). Back strengthening exercises. Care clinic Health Watch series, 50 (8), 51-55.
19. Shepherd, A. (2010). Low back pain an overview. British journal of nursing, 19(9), 77
20. Sridevy, S . (2008). Effect of therapeutic Back Massage on Non- Specific Low Back Pain. Nightingale nursing times, 14(12), 65-67.
21. Stan Reents. (2007). Exercise and back pain. Journal of Indian medicine, 19(7), 36-39.
22. Sherry V. Risch. (1993). Physiological and Psychological benefits, Lumbar strengthening in Chronic low back patients. Journal of spine, 18(2), 47-49.
23. Ted Dreisinger., (2004). Mckenzie Therapy for Mechanical Low Back Pain Journal of physiotherapy, 4(1), 41-43.

Electronic version.

1. Agoado, A.L. & Herbst, R. (2000). Back pain research.
<http://www.backpain.com>.
2. Betts,D.(2010).Exercise therapy sites.
<http://www.helpself.com>
3. Birch, S. & Hadhazy. (2001). Acupressure and osteoarthritis.
<http://www.enotes.com/alternativemedicine .com>
4. Burton ,A.K. (2004). European guidelines for prevention in low back pain
<http://www.paineurope.com>
5. Candy,B.Ramsay,J.Bryar,R.M.&Taylor,S.J.(2005) .Research in pain
<http://www.ncbi.nlm.nih.gov/pubmed>.
6. Deborah.L. (2010). Back pain life expectancy.
<http://www.about.com/>
7. Eriksen (2004). Physical activity/Physical exercises
<http://www.pain Europe.com>
8. Hides, J K .(2005). Preventing low back pain.
<http://www.selfgrowth.com>
9. Kimpotts. (2004). Back massage for pain treatment.
<http://www.google.com>.
10. Linton (2004) . Lumbar supports
<http://www.pain Europe.com>
11. Miller , M. (2006). Low back pain
<http://www.medicalnewstoday.com>

12. Orthopaedic nursing.

<http://scholar.google.co.in>

13. Reed, M.J. (2010). Healing information on exercise.

<http://www.acupressure.com/>

14. Richard, E. (2005). Body mechanics to modify classroom alertness.

<http://www.liebertonline.com>.

15. Simpson. (2010). Pain.

<http://en.wikipedia.org/wiki>

16. Spinasanta, S. (2010). Exercises : a safe alternative therapy.

<http://www.spineuniverse.com>

17. Stenton, J. (2008). Lower back.

<http://www.wikepedia.com>

LIST OF CONTENTS

Chapter no	Title	Page no
1	INTRODUCTION	1
	Significance and Need for the study	4
	Statement of the problem	7
	Objectives	7
	Hypotheses	7
	Operational definitions	7
	Assumptions	9
	Delimitations of the study	10
	Ethical consideration	10
	Conceptual frame work	11
2	REVIEW OF LITERATURE	13-26
3	METHODOLOGY	27
	Research approach	27
	Research design	27
	Setting of the study	28
	Variables	28
	Population	28
	Sample size	28

	Sampling technique	28
	Sample selection criteria	29
	Description of tool	29
	Validity and Reliability	30
	Pilot study	30
	Data collection procedure	30
	Plan for data analysis	31
4	DATA ANALYSIS	33-46
5	DISCUSSION	47-50
6	SUMMARY AND RECOMMENDATION	51
7	BIBLIOGRAPHY	59
8	APPENDICES	

LIST OF TABLES

Table No	Title	Page No
1	Distribution of study subjects and matching them for the selected demographic variables	35
2	Effectiveness of back strengthening exercises in reducing the level of back pain in experimental group and control group	42
3	Mean reduction of back pain in experimental group after exercises with control group	44
4	Association between the level of back pain and selected demographic variables	46

LIST OF FIGURES

Figure No	Title	Page No
1	Conceptual frame work – Lydia. E.Halls Core, care, cure model	12
2	Schematic diagram of research design of the study	32
3	Distribution of demographic variables according to Age	37
4	Distribution of demographic variables according to Sex	38
5	Distribution of demographic variables according to Educational status	39
6	Distribution of demographic variables according to body built	40
7	Distribution of demographic variables according to Occupation	41
8	Comparison of mean low back pain scores of experimental and control group	43
9	Mean reduction of back pain in experimental group after exercises with control group	45

APPENDICES

Appendix No	Title	Page No
1	List of experts for tool validation	xii
2	Evaluation criteria check list for tool validation.	xiii
3	Tools used for the study	xv - xviii
4	Data collection procedure	xix-xxii

APPENDIX - I**LISTS OF EXPERTS VALIDATED****1. Mrs. Ajitha Jothis M.sc (N)**

Asst. Professor

C.S.I. College of Nursing,

Karakonam.

2. Mrs. Kilda . S. M.sc (N)

Vice Principal

White Memorial College of Nursing,

Attor.

3. Mrs. S.S.Sharmila M.sc (N)

Reader

Christian College of Nursing,

Neyyoor.

4. Mrs. Sheeba .C. M.sc (N)

Asst. Professor

Christian College of Nursing,

Neyyoor.

5. Dr. V. Murugan M.D.

Asso. Professor of Medicine

Sree Mookambika Medical College,

Kulasekharam.

APPENDIX-II

EVALUATION CRITERIA CHECK LIST FOR VALIDATION

Introduction

The expert is requested to go through the following criteria for the evaluation. Three columns are given for response and a column for remarks. Kindly place a tick mark in the appropriate column and give remarks.

Interpretation columns

Column 1- Meets the criteria

Column 2- Partly meets the criteria

Column 3- Does not meet the criteria

Sl.No	Criteria	I	II	III	Remarks
1.	Scoring <ul style="list-style-type: none"> ➤ Appropriateness ➤ Adequacy ➤ Accurateness ➤ Clarity ➤ Simplicity 				
2.	Content <ul style="list-style-type: none"> ➤ Organization <ul style="list-style-type: none"> • Logical • Continuity 				

	<ul style="list-style-type: none"> ➤ Adequacy ➤ Appropriateness ➤ Relevance 				
3.	Language <ul style="list-style-type: none"> ➤ Appropriateness ➤ Clarity ➤ Simplicity ➤ Concise ➤ Precision 				
4.	Practicability <ul style="list-style-type: none"> ➤ Is it easy to score ➤ Does it precisely measure ➤ The skill ➤ Utility 				

Any other suggestion

Signature

Name, designation

Address.

APPENDIX - III**SECTION – A****DEMOGRAPHIC VARIABLES****1. Age**

- a. 20-30yrs
- b. 30-40yrs
- c. 40-50yrs
- d. 50-60yrs

2. Gender

- a) Male
- b) Female

3. Educational status

- a) Literate
- b) Illiterate

4. Body Built

- a) Lean
- b) Moderate
- c) Obese

5. Occupation

- a) Heavy worker
- b) Moderate
- c) Sedentary

SECTION B

ABERDEEN LOW BACK PAIN SCALE

Question	Response	Points
1, In the past 2 weeks how many days did you suffer pain in the back or leg(s)?	None at all	0
	Between 1 and 5 days	1
	Between 6 and 10 days	2
	For more than 10 days	3
2, On the worst day during the past 2 weeks how many painkilling tablets did you take?	None at all	0
	Less than 4 tablets	1
	Between 4 and 8 tablets	2
	Between 9 and 12 tablets	3
	More than 12 tablets	4
3, Is the pain made worse by any of the following?	Coughing	+1
	Sneezing	+1
	Sitting	+1
	Standing	+1
	Bending	+1
	Walking	+1
4, Do any of the following movements ease the pain?	Lying down	+1
	Sitting down	+1
	Standing	+1
	Walking	+1
5, In your right leg do you have any pain in the following areas?	Pain in the buttock	+1
	Pain in the thigh	+1
	Pain in the calf	+1
	Pain in the foot or ankle	+1
6, In your left leg do you have any pain in the following areas?	Pain the buttock	+1
	Pain in the thigh	+1
	Pain in the calf	+1
	Pain in the foot or ankle	+1
7, Do you have any loss of feeling in your legs?	No	0
	Yes just one leg	1
	Yes both legs	2
8, In your right leg do you have any weakness or loss of power in the following areas?	Hip	+1
	Knee	+1
	Ankle	+1
	Foot	+1
9, If you were to try and bend forward without bending your knees how far down do you think you could bend before the pain stopped you?	I could touch the floor.	0
	I could touch my ankles with the tips of my fingers.	1
	I could touch my knees with the tips of my fingers	2
	I could touch my mid thighs with the tips of my fingers.	3
	I couldn't bend forward at all	4

10, In your left leg do you have any weakness or loss of power in the following areas?	Hip	+1
	Knee	+1
	Ankle	+1
	Foot	+1
11, On the worst night during the last 2 weeks how badly was your sleep affected by the pain?	Not affected at all	0
	I didn't lose any sleep but needed tablets	1
	It but prevented me from sleeping but i slept for more than 4 hours	2
	I only had 2-4 hours of sleep	3
	I had less than 2 hours of sleep	4
12, On the worst day during the last 2 weeks did the pain interfere with your ability to sit down?	I was able to sit in any chair for as long as i liked.	0
	I could only sit in my favourite chair as long as i liked	1
	Pain prevented me from sitting more than 1 hour	2
	Pain prevented me from sitting more than 30 minutes	3
	Pain prevented me from sitting more than 15 minutes	4
	Pain prevented me from sitting at all	5
13, On the worst day during the last 2 weeks did the pain interfere with your ability to stand?	I could stand as long as i wanted without extra pain	0
	I could stand as long as i wanted but it gave me extra pain	1
	Pain prevented me from standing more than 1 hour	2
	Pain prevented me from standing more than 30 minutes	3
	Pain prevented me from standing more than 15 minutes	4
	Pain prevented me from standing at all	5
14, On the worst day during the last 2 weeks did the pain interfere with your ability to walk?	Pain did not prevent me walking any distance	0
	Pain prevents me walking more than 1 mile	1
	Pain prevents me walking more than ½ mile	2
	Pain prevents me walking more than ¼ mile	3
	I can walk but less than ¼ mile	4
	I was unable to walk at all	5
15, IN the last 2 weeks did the pain prevent you from carrying out your work housework and other daily activities?	No not at all	0
	I could continue with my work but my work suffered	1
	Yes for one day	2
	Yes for 2-6 days	3
	Yes for 7 days or more	4
16, In the last 2 weeks for how many days have you had to stay in bed because of the pain?	None at all	0
	Between 1 and 5 days	1
	Between 6 and 10 days	2
	For more than 10 days	3

17, In the last 2 weeks has your sex life been affected by your pain?	Not affected by the pain	0
	Mildly affected by the pain	1
	Moderately affected by the pain	2
	Pain prevents any sex life at all	3
	Does not apply	4
18, In the last 2 weeks have your leisure activities been affected by your pain?	Not affected by the pain	0
	Mildly affected by the pain	1
	Moderately affected by the pain	2
	Severely affected by the pain	3
	Pain prevents any social life at all	4
19, In the last 2 weeks has the pain interfered with your ability to look after yourself	Not at all	0
	Because of the pain I needed some help looking after myself	1
	Because of the pain i needed a lot of help looking after myself	2
	Because of the pain i could not look after myself at all	3

Total Score = 75

Back pain severity score = $\text{SUM}(\text{points for all questions answered}) / \text{SUM}(\text{maximum points for questions answered}) * 100$

INTERPRETATION

Less than 10% is considered as negligible pain.

RANGE	CATEGORY
10-40%	MILD
40-70%	MODERATE
70-100%	SEVERE

APPENDIX IV

DATA COLLECTION PROCEDURE

Back strengthening exercises

Back strengthening exercises are to strengthen and to stretch the muscles that support the spine. It strengthens the spinal column and it supports muscles, ligaments and tendons.

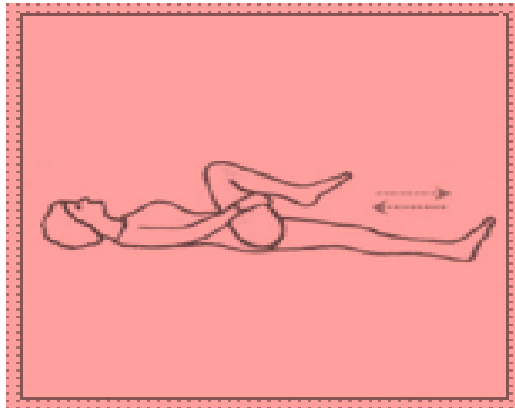
Procedure

Patients who were diagnosed with low back pain were selected. Pre-assessment was done with Aberdeen Low Back Pain Scale for back pain patients and then mild to moderate level of back pain were selected as study samples. And they were allotted to experimental and control group using purposive sampling technique. Then the researcher taught/demonstrated back strengthening exercises for the samples in the experimental group. After implementation the researcher made the samples to practise the same for duration of 30 minutes for 7 days and also insisted them to practice the same for twice a day. Then post assessment was done on the 15th day with the same tool.

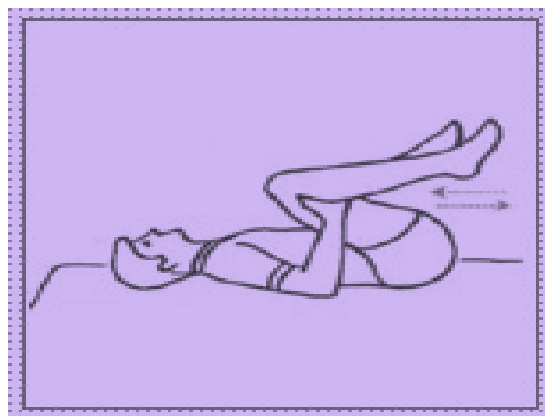
Exercise session includes:-

- **Knee to chest exercises** :- In this session patient is advised to lie on his back on a firm surface. Clasp his hands behind the thigh and pull it towards his chest. The patient is instructed to keep the opposite leg flat on the surface

of the floor. Maintain the position for 3 seconds. Switch legs and repeat 5 times.

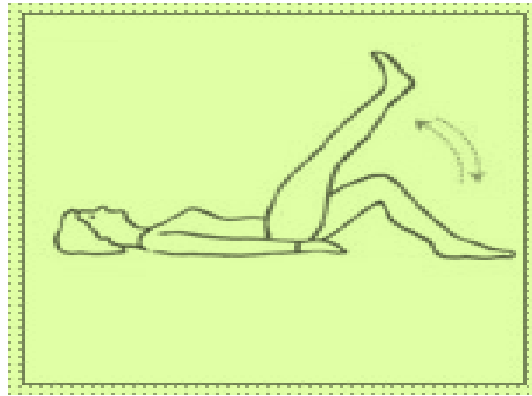


- **Lower abdominal exercises** :- Patient is advised to lie on his back with his knees bent and feet flat on his bed. Raise his both knees towards chest. Place both hands under his knees as close to his chest as possible. The patient is advised not to raise head and repeat for 5 times.

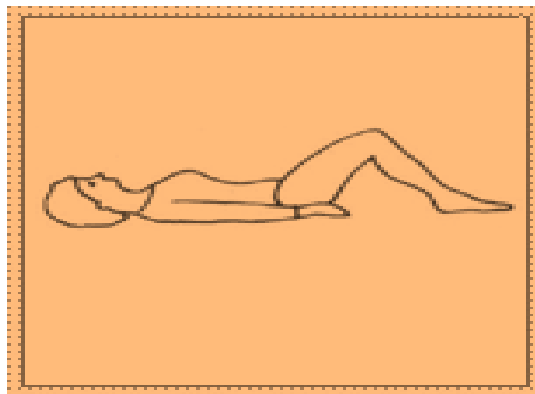


- **Knees to chest exercises** :- Patient is advised to keep his knees bent and lie flat on the floor. Flatten his back to the floor by pulling his abdominal muscles

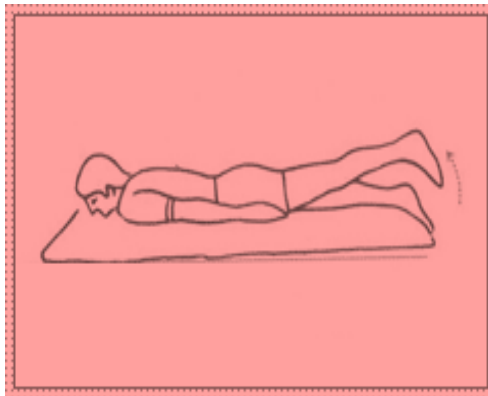
up and in. Raise his legs keeping knees straight. Hold for 3 seconds. Slowly lower the leg to the floor. Maintain pelvic tilt and keep resting leg relaxed at all times. Do not hold breath.



- **Pelvic tilt** :- In this session patient is advised to push the small of his back into the floor by pulling the lower abdominal muscles up and in. Hold his back flat while breathing easily in and out. Hold for 3 seconds. Do not hold breath.



- **Leg raises** :- Patient is advised to lie on his stomach. Tighten the muscles in one leg and raise it from the floor. The patient is instructed to hold his leg up for a count of 5 and return it to the floor and do the same with other leg.



- **Hip extension :-** In this session patient is advised to bend his knees to a 90 degree angle so the sole of his foot faces the ceiling. Lift one thigh off the floor approximately 6 inches by raising his foot towards the ceiling. Slowly lower his thigh back to the starting position. Repeat 5 times.

